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## KEYS TO COLOR PRINTING, Part VIII

### (The Master Control Negative)

LET'S FACE IT — to make consistently good Type C color prints with as little testing, balancing, and time wasting as possible, you have to keep the variables under control. And what are the major variables? The differences between any one type of color-negative emulsion are minor. So are the differences in any one person's *careful* print-processing procedure. Instead, *the greatest causes of "variability" in color printing are due to differences in the subject and the type of illumination used.* Thus, negatives of the same building photographed at 8:00 a.m. and 11:00 a.m. may need different filter packs in the enlarger to produce prints with the same color balance.

Of course, these subject differences are something that are simply there and always will be. Your job is to *find a system that will help to catalogue various subject differences in terms of CC Filter printing differences.* Makes sense, doesn't it?

Such a technique is the master-nega-

tive system. Briefly defined, a master control negative is an average, normal negative exposed under known conditions—one which you *know* will make an excellent print. In other words, you have printed it previously and have an accurate record of which Kodak Color Compensating Filter combination was required for a particular Type C emulsion. Here, therefore, is a standard situation which you can use for comparison purposes. This master negative can be useful in at least three different ways: (1) for reprinting old negatives, (2) for comparing a new paper with the old paper, and (3) for checking processing.

### Master Control Negative Characteristics

First, let's talk about this special negative, since the better you understand its characteristics, the better you'll see how to put them to practical use.

We've said that the master negative should be "average" and "normal." Now

let's pin that down a bit more. Generally, the negative should be typical of the majority of negatives you have to print. If you specialize in outdoor shots on Kodacolor Film, your master negative should obviously be an outdoor shot on Kodacolor Film. Further, it should be exposed normally and processed normally, and it should contain a typical subject with typical lighting. That is, the lighting ratio and light direction should be similar to those used for most of the negatives you will be printing in the future.

It will help considerably if your master negative contains some "sensitive" areas. By this we mean areas that are relatively sensitive to minor color-balance changes. For example, a sunset or a flower is not a good test object, because either can be printed with several variations of colors and still be pleasing. However, the face in a portrait is a sensitive area, as is a large chunk of sunlit concrete! Surprising as it may seem, a prominent sunlit tree trunk may be helpful in evaluating small color differences for middle tones and shadow areas. Actually, we suggest including a Kodak Neutral Test Card

which lends itself to more exact and reproducible measurement than these other "natural" objects.

Suppose, on the other hand, that you want to print not only outdoor landscapes but also a variety of color subjects. You may then find it advantageous to have on the type of color-negative film you generally use a "primary" master negative of a specially made setup, plus one or more "secondary" types of actual subject-lighting situations. In this case, you would want to know the basic enlarger filter pack for each of them. We believe this system will be so helpful to you in making good prints quickly and efficiently that we have diagrammed the basic possibilities for you at the bottom of this page.

Now let's put the master-negative system to use in your darkroom.

### For Negatives Which Are Reprinted Occasionally

All color negatives, even if of the same subject type and exposed under similar conditions, will probably print similarly, but not identically. This may be due to slight variations in either time of day, subject type, film processing, or

## MASTER NEGATIVES for Type C Printing

PRIMARY MASTERS	1 KODACOLOR* or EKTACOLOR Type S			2 EKTACOLOR Type B		
	1a	1b	1c	2a	2b	2c
SECONDARY MASTERS	Daylight with 85C filter	Speedlight with 85 filter	Flash lamp (no filter)	3200°K Portrait Subject	3200°K Commercial Subject	Daylight with 85B filter

\*No filter is necessary in daylight for negatives that will be printed by photofinishers. A Wratten 85C Filter is recommended if you make your own Type C prints and you want your outdoor negatives to print with the same enlarger balance as your indoor flash shots.



other factors. These differences are normal and should be expected. However, the important thing is to think of these balance variations in terms of *CC filter differences between the new negative and the master negative*. Thus, for making a normal print from the master negative, suppose that your filter pack consists of a Kodak Color Compensating Filter CC-40R + CC-20Y + a Kodak Wratten Filter No. 2B, and the best density level is attained at an exposure time of 10 seconds. These filters remain in the enlarger's optical system as an excellent starting point for similar negatives as long as you are using the same Type C emulsion as that used for obtaining a pleasing print from the master negative. You now find that it is necessary to add a CC-10M filter to the pack and adjust the printing time to 12 seconds in order to compensate for the difference between the new negative and the master negative. In other words, the new negative prints differently from the master negative by a CC-10M filter and 20-percent increase in printing time. These two differences should be recorded on the new negative's file envelope because the relative differences

*will always remain constant*, regardless of the characteristics of the Type C emulsions which might be used in the future. For example, six months from now, you might wish to reprint this same negative. But this time you have a different Type C emulsion, and the basic filter pack in your enlarger (to print the master negative the same way) has become a CC-20M plus the ever-present 2B. Beside a small adjustment in exposure time, you need only add a CC-10M filter to the pack (or change the CC-20M to CC-30M) in order to make a normally balanced print *the first time* from the negative being printed.

### For Comparing a New Paper With The Old Paper

From a balance standpoint, Kodak Color Print Material, Type C, varies slightly from one emulsion to another. Consequently, there arises a rebalancing problem when you have used up a particular emulsion and start with a new emulsion.

Here, again, is where the master negative should be used. Actually, your primary purpose is *to find the new basic*

19

1  
and 2

Preferably, these should be made from a specially prepared test scene containing some "sensitive" pastel colors, a normal face, a Kodak Neutral Test Card, and a Kodak Color Separation Guides kit (which includes a 9-color Kodak Control Patch and a 10-step Kodak Gray Scale). If you have a Kodak Color Densitometer, Model 1, you can check the density level accurately. When read through the red filter, the approximate density of a normally exposed master negative (Kodacolor, Type S or B) should be, for the gray side of the Kodak Neutral Test Card, when held directly in front of the subject's face, 0.70 to 0.80; for the highest diffuse density of a normally lighted forehead, 1.00 to 1.20; for the lowest step in a Kodak Gray Scale receiving essentially the same illumination as the subject, 0.20 to 0.30. Note that 0.20 should be considered as the absolute minimum density—actually, we suggest a slightly higher value.

1a

A normal daylight scene typical of those you print most frequently. Preferably exposed on a clear, sunny day between 10:30 a.m. and 2:30 p.m.

1b

Since there are some differences between speedlights, this should obviously be made with YOUR unit. Subject must be "average."

1c

Be sure that no contaminating light source, such as a window or intense tungsten lamp, is nearby. Room size should be average, and wall colors, near-neutral.

2a

With regard to lighting ratio, use your standard portrait setup, a subject in normal "key"; and background colors neutral or subdued.

2b

Use a type of commercial shot. The lighting direction, the lighting contrast, and the lighting units themselves are apt to be different than for portraits; hence, this master-negative type.

2c

Same subject characteristics as for Type 1a. Remember, however, that the different printing characteristics of Kodak Ektacolor Film, Type B and Type S, make separate master-negative types advisable.

*filter pack for the primary master negative* when printing on the new Type C emulsion. The balance for the one-master negative is all that is needed, since the relative difference between the primary master and its "sub-type" secondary master remains constant. We suggest that, just before you run completely out of the old paper, you make two test prints from the master negative, as follows:

Print No. 1. With the *old* paper and the *previous* filter pack.

Print No. 2. With the *new* paper and the same *previous* filter pack.

These two prints — which can be small contact prints to save paper — should be *processed together* in unexhausted solutions and with a normal processing technique. The important thing is, of course, your evaluation of this test. Here are the things to look for and the probabilities:

(a) Print No. 1 should give you a processing check. If your printing and processing were standard, the print from the master negative will look the same as when printed previously, and any filter-balancing assumptions will be valid.

(b) Print No. 2, when compared with Print No. 1, will give you an accurate idea of the relative difference between the old and new Type C emulsions. It is unlikely, although possible, that these prints will have identical color balance. If they are alike, obviously the previous filter pack will not have to be changed for the new paper. If, however, the print is unsatisfactory, slight adjustments in the exposure time and filter pack will have to be made. The difference should be fairly small, in which case you can estimate accurately the filter modifications necessary to achieve a normal balance (see Keys to

Color Printing, Part I). If Print No. 2 differs from Print No. 1 by more than the change caused by a CC-10 filter, an additional rebalancing test is indicated.

### For Checking Processing

For trouble shooting or simply as a routine check on your processing technique, the master negative is invaluable. A small print made carefully, with controlled voltage, from the master negative and processed in the same batch with your other prints will tell you at a glance if some adverse change has affected processing solutions or procedure and, in general, whether you are "on the beam" from a processing standpoint.

There is no reason why you cannot pre-expose a limited supply of these master-negative prints—call them processing control strips, if you wish—if you adhere to the following precautions: *Keep the exposed supply in a freezer—just cool in a refrigerator won't do for this purpose; it must be frozen (0 to -10 F).* However, before freezing, the processing control strips should be stabilized at room temperature for about 24 hours after exposure. Most of the changes in latent-image keeping occur in the first 12 to 24 hours. It is best to allow the changes to occur before freezing the samples. These strips should be wrapped individually in aluminum foil to make water-vapor-proof packages. Then, prior to processing a batch of Type C prints, take out one of the control strips and, in order to minimize condensation on the paper, let it come up to room temperature while still wrapped up. The warm-up time requires only a few minutes and should be consistent to avoid balance changes.

We use this master negative system ourselves—hope the idea helps you too.



it's  
faster  
than  
you  
think!



WE'D LIKE to present our case with just this one picture. We admit we were tempted to use a night football game that *looked like a daylight shot* except for the multiple shadows, a group of basketball players *frozen in mid-air* with an *existing-light exposure of 1/400 second*, or a *night aerial shot* of St. Louis that clearly showed the downtown

buildings.

But this existing-light picture at the airport does the job. It was actually night, not twilight. The illumination from ordinary ramp lights measured only 3 foot-candles at the subject. The exposure was 1/5 second at f/5.6. The film could only have been Kodak Royal-X Pan.



# movies that work for a living



MORE AND MORE commercial and industrial photographers are being presented with orders for motion-picture photography. The average still photographer is apt to be a bit taken aback by this turn of events, especially when he turns to his library and finds that he really hasn't much that will help him in making functional motion pictures.

A modest attempt to bridge this gap in the literature is our new Kodak Data Book *Industrial Motion Pictures*. It discusses those tools and techniques which must be used for the efficient production of an effective film which is the

low-budget, service-type picture. In general, this means films of a technical rather than promotional type. Included are films made and used internally by many companies for worker training or orientation, work standards, time-and-motion study, methods evaluation, and simple records and reports.

This Data Book outlines briefly the techniques of telling a story through the medium of motion pictures and then goes on to a discussion of the practical considerations in planning, lighting, filming, editing, titling, adding sound (if desired), and assembling the film for projection. The last section of the book is devoted to a discussion of the selection of the type of film on which motion pictures should be made, ending with a complete set of Data Sheets on 16mm Cine-Kodak Films.

*Industrial Motion Pictures* is an elective member of the *Kodak Industrial Handbook* series — not one of the basic components of the handbook. Its 76 pages, crammed with movie-making information, are a bargain at only 50 cents. See your Kodak dealer.

**Are your handbooks up to date? So you can check yours, here is the latest listing. Available at dealers now.**

## **Kodak Professional Handbook**

Camera Technique for Professional Photographers—*First Edition*, 1952—First 1953 Printing .....50¢

Negative Making for Professional Photographers — *First Edition*, 1952 — Second Printing, 1956 .....50¢

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Use, Maintenance, and Repair of Professional Equipment—*First Edition*, 1952—First 1953 Printing .....50¢

## **Kodak Color Handbook**

Color As Seen And Photographed—*First Edition*—Third Printing, 1956 .....75¢

Color Photography Outdoors—*First Edition*—Fifth Printing, 1956 .....75¢

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Kodak Color Films—*Second Edition*—First Printing, 1956 .....75¢

## **Kodak Industrial Handbook**

How To Organize And Operate Photographic Service Departments—*First Edition*, 1955—First Printing .....50¢

Photographic Production Of Slides And Filmstrips—*First Edition*, 1955—First Printing .....50¢

How-To-Do-It Pictures — *First Edition*, 1956—First Printing .....50¢



Making Service Pictures For Industry—*First Edition*, 1952—First Printing ....50¢



# condensed data

# Kodak color films

(FOR USE IN STILL CAMERAS)

Code Notch or Roll Designation	Process (Chemicals or Kits)	Film Name	Type	Exposure Index or Guide Number (GN) and Suggested Kodak Wratten Filter				
				Daylight	Electronic Flash <sup>1</sup>	Clear Flash <sup>2</sup>	Photoflood	3200 K Lamps
	B-41	Ektacolor	B	5 No. 85B	Not Recommended	(GN) 55 No. 81EF	6 No. 81A	8 No filter
	C-22	Ektacolor	S	25 No. 85C	12 No. 85	(GN) 120 No filter	20 <sup>3</sup> No. 82A	16 <sup>3</sup> No. 82C
C(No.)	C-22	Kodacolor	Dual Purpose	32 No filter	12 No. 85	(GN) 120 No filter	20 <sup>4</sup> No. 82A	16 <sup>4</sup> No. 82C
	E-1	Ektachrome	Daylight	12 No filter	See instructions	(GN) 55 <sup>5</sup> No. 80C	4 No. 80B	2.5 80B + 82A
	E-1	Ektachrome	B	6 No. 85B	Not Recommended	(GN) 60 No. 81C	8 No. 81A	10 No filter
	E-2	Ektachrome	Daylight	32 No filter	32 No filter	(GN) 90 <sup>5</sup> No. 8C	12 No. 80B	8 80B + 82A
E(No.)	E-2	Ektachrome	F	16 No. 85C	Not Recommended	(GN) 120 No filter	16 No. 82A	12 No. 82C
	K135	Kodachrome Professional	A	10 No. 85	Not Recommended	(GN) 80 No. 81C	16 No filter	12 No. 82A
K(No.)	No Kits <sup>6</sup>	Kodachrome	Daylight	10 No filter	10 No filter	(GN) 50 <sup>5</sup> No. 80C	5 No. 80B	3 80B + 82A
	K(No.)F	Kodachrome	F	10 No. 85C	Not Recommended	(GN) 95 No filter	12 No. 82A	10 No. 82C

<sup>1</sup>Exposure Indexes in this column can be used to compute guide numbers as described in the Kodak Data Book Flash Technique.

<sup>2</sup>Guide Numbers for open flash or 1/25 second with No. 5 or 25 lamps in 4- to 5-inch polished reflector.

<sup>3</sup>Sufficient light must be provided for an exposure time of 1/25 second or shorter.

<sup>4</sup>Sufficient light must be provided for an exposure time of 1/2 second or shorter.

<sup>5</sup>The same guide number applies for the use of No. 5B or 25B lamps without a filter.

<sup>6</sup>Processing manuals, licenses, and chemicals available from Eastman Kodak Company.

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## Kodak Color Compensating Filters and Filter Factors for Use with G-E and Sylvania Fluorescent Lamps

Film	Daylight	White	Warm white*	Cool white
Kodak Ektachrome, Type B	N.R.†	CC-30R + ½ stop	CC-20R + ½ stop	CC-50Y+40M +1 ½ stop
Kodak Ektachrome, Daylight Type	CC-30R + ½ stop	N.R.†	N.R.†	N.R.†
Kodachrome, Type A	N.R.†	CC-10Y+CC-30M + ½ stop	CC-30M + ½ stop	CC-40Y+CC-30M +1 ½ stop
Kodachrome, Type F	N.R.†	CC-30M + ½ stop	CC-10C+CC-30M +1 stop	CC-30M+CC-20Y +1 stop
Kodachrome, Daylight Type	CC-30M+10Y +1 stop	N.R.†	N.R.†	N.R.†
Kodak Ektachrome, Type F	N.R.†	CC-20R + ½ stop	CC-10M + ½ stop	CC-30M+CC-20Y +1 stop
Kodak Ektachrome, Daylight Type	CC-20R + ½ stop	N.R.†	N.R.†	N.R.†

\*G-E only.

†N.R.=not recommended.

These filter recommendations, with the necessary increase in exposure, are for the use of Kodak color films exposed to fluorescent lamps. Note that the suggested filtration and exposure factor will give the best rendering under the circumstances, but not so good as with the light sources for which the film is intended.

Sales Service Division

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